

WHAT IS CLAIMED IS:

1. An optical encoder comprising:
a coding element having a track with at least one transparent section;
5 a light emitting diode (LED) positioned to output light to the track; and
a photodetector array positioned to detect light that passes through the
transparent section of the track, the photodetector array comprising first and
second photodetectors with different surface areas and a combined width
dimension that allows the entire photodetector array to be simultaneously lit by
10 light that passes through the transparent section of the coding element.
2. The optical encoder of claim 1 wherein the first and second photodetectors
generate different amounts of photocurrent when simultaneously lit by the LED.
- 15 3. The optical encoder of claim 1 wherein the track of the coding element
includes an opaque section with a width dimension that matches the width
dimension of the first photodetector.
4. The optical encoder of claim 1 further including a third photodetector,
20 wherein the surface area of the first photodetector is greater than the surface area
of the second and third photodetectors combined.
5. The optical encoder of claim 4 wherein the first photodetector generates
more photocurrent than the second and third photodetectors combined when the
25 first, second, and third photodetectors are simultaneously lit.
6. The optical encoder of claim 4 wherein the second and third
photodetectors are located adjacent to either side of the first photodetector.
- 30 7. The optical encoder of claim 6 wherein the coding element includes an
opaque section with a width dimension that matches the width dimension of the
first photodetector.

8. The optical encoder of claim 1 wherein the track is an index track and wherein the coding element includes a position track having multiple transparent sections, the optical encoder further comprising a position track photodetector array positioned to detect light that passes through the transparent sections of the position track.
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9. The optical encoder of claim 1 wherein the track comprises a primarily transparent track with at least one opaque section.
- 10 10. The optical encoder of claim 1 wherein the track comprises a primarily opaque track with at least one transparent section.

11. An optical encoder for indicating the rotational movement of a shaft comprising:

a codewheel having an index track with at least one transparent section;
a light emitting diode (LED) positioned to output light to the track; and
5 an index photodetector array positioned to detect light that passes through the transparent section of the index track, the index photodetector array comprising first and second photodetectors with different surface areas and a combined width dimension that allows the entire index photodetector array to be simultaneously lit by light that passes through the transparent section of the
10 codewheel.

12. The optical encoder of claim 11 wherein the first and second photodetectors generate different amounts of photocurrent when simultaneously lit by the LED.

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13. The optical encoder of claim 11 wherein the index track of the codewheel includes an opaque section with a width dimension that matches the width dimension of the first photodetector.

20 14. The optical encoder of claim 11 further including a third photodetector, wherein the surface area of the first photodetector is greater than the surface area of the second and third photodetectors combined.

15. The optical encoder of claim 14 wherein the first photodetector generates
25 more photocurrent than the second and third photodetectors combined when the first, second, and third photodetectors are simultaneously lit.

16. The optical encoder of claim 14 wherein the second and third photodetectors are located adjacent to either side of the first photodetector and
30 wherein the coding element includes an opaque section with a width dimension that matches the width dimension of the first photodetector.

17. An optical encoder comprising:
a coding element having an index track with at least one transparent
section and a position track with multiple transparent sections;
a light source positioned to output light to the index and position tracks;

5 and

an index photodetector array comprising a first index photodetector
positioned to detect light that passes through the multiple transparent sections of
the position track and a second index photodetector positioned to detect light that
passes through the at least one transparent section of the index track.

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18. The optical encoder of claim 17 wherein at least one transparent section of
the index track has a width dimension that is the same as the width dimension of
the second index photodetector.

15 19. The optical encoder of claim 17 wherein the transparent sections of the
index and position tracks are configured such that, at one position of the coding
element, more surface area of the second index photodetector is lit than the first
index photodetector.

20 20. The optical encoder of claim 17 further including a position photodetector
array positioned to detect light that passes through the multiple transparent
sections of the position track, the second index photodetector of the index
photodetector array being integrated with the position photodetector array.

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